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SUBJECT: NUCLEAR FORENSICS EXPERTS PLAN PATH FORWARD

**¶1.** (SBU) Summary: Atomic energy, law enforcement and policy experts from nearly 30 countries met in Sofia, Bulgaria June 17-19 under the auspices of the Nuclear Smuggling International Technical Working Group (ITWG) to share experience on nuclear forensics and illicit trafficking issues. The ITWG will conduct an analytic exercise this fall involving nuclear material, agreed on elements of a 3-year plan for further forensic exercises, and is preparing a guideline for crime scene analysis involving nuclear or radiological materials. These activities will allow the ITWG to make tangible contributions to many governments' forensics efforts. On the margins of the ITWG, German, French and UK reps expressed support for a Global Initiative to Combat Nuclear Terrorism (GICNT) Plan of Work activity this fall on collective experiences in international forensics cooperation. End Summary.

**¶2.** (U) Background: ITWG was established by the G-8 in 1995 as an informal technical body to promote international cooperation to prevent nuclear smuggling. The ITWG holds annual meetings that include atomic energy, law enforcement and policy experts with roles in nuclear forensics. Presently more than 40 governments participate. The ITWG has four task groups involving evidence collection, analytic and tabletop exercises, guidelines and communications/outreach. The United States and EC co-chair the ITWG, which has an executive council with representatives from US, EC, Hungary, UK and France. In addition, U.S. National Laboratory employees lead or co-chair three of the task groups (Exercises, Guidelines and Communications/Outreach). The Evidence Collection task group is co-chaired by Australia and Canada. The ITWG has held joint analyses of highly-enriched uranium and plutonium that have led to the identification of international best practices in the field of nuclear forensics. The last exercise was completed in 2002.

## Evidence Collection and Processing Task Group

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¶13. (SBU) The Evidence Collection and Processing Task Group (ECPTG) is preparing a draft guideline on crime scene evidence, collection that involve nuclear or radiological material. The draft will be prepared by Canada, draw from U.S. and Australian procedures and will be circulated among the task group for comment late this summer. In addition, ECPTG is preparing a template for a catalogue of national response exercises involving the analysis of nuclear or radiological material which they will evaluate with real-world data from Canada and Hungary. (Comment: The USG - possibly the NTNFC - should consider sharing exercise data with the group to help evaluate the catalogue. End Comment.) The group hopes to post the catalogue to the ITWG's secure web site later this year.

## Exercise Task Group

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¶14. (SBU) The Exercise Task Group (ETG) is finalizing preparations for an 11-country round robin scheduled for later this fall. Arrangements to ship samples to nine of the eleven labs have been initiated and the organizer hopes to finalize arrangements for the other two labs in the coming weeks. (Comment: Efforts to incorporate an IAEA brokering role into the round robin failed to materialize. This delay has led to some frustration among round robin participants and a lull in ITWG activities. The U.S. interagency should evaluate the circumstances of the material shipment and whether the IAEA brokering role is a valid method for shipping samples of illicit trafficked materials to forensic labs. The EU ITWG co-chair opined that such IAEA support requires cooperation across the Office of Nuclear Security, Safeguards division and analytic labs and that they need to work out the kinks in the 'brokering relationship' the Agency has with ITWG Nuclear Forensic Lab (INFL). End Comment.)

¶15. (SBU) In addition, the ETG outlined expected exercises in the coming three years. These include a possible round robin involving plutonium metal, another comparing pelletized and powdered LEU, and another involving contaminated evidence. The ETG will prepare a strategic plan in the next six months for these exercises which will be posted to the ITWG's secure web site. In addition, the ETG will post to the web site a series of tabletop exercises that they have prepared and are available to ITWG members. The ETG also offered a framework for graded evaluations derived from measurements that characterize sample materials. This graded evaluation framework is being finalized into a guideline and is expected to be approved prior to the execution of the materials exercise this fall.

## Guidelines Task Group

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¶16. (SBU) The Guidelines Task Group (GTG) articulated a definition of ITWG guidelines for materials and methods as well as a statement on their intended use and audience. In addition they articulated review/approval procedures for ITWG guidelines. In the past ITWG guidelines and reference materials have been incorporated in IAEA Nuclear Security Series documents. The GTG has several draft guidelines in the queue including: a graded nuclear forensics evaluation framework, the crime scene document being worked by ECPTG, as well as ones on radio-chemical separations, thermal ion exchange and X-ray diffraction. Ekaterina Kuteynikova of the Bochvar Institute offered to draft two guidelines. The first is a guideline on analytical sampling issues in nuclear forensics. She will be assisted in this effort by Dinara Abbasova of Azerbaijan. The second is a guideline on a classification

scheme for nuclear materials.

Outreach and Communications Task Group

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¶7. (SBU) The Outreach and Communications Task Group (OCTG) plans to create a modest web site that would be open to the public and to continue interactions with the G8 (particularly briefing the Nuclear Security and Safety Group), the GICNT and the IAEA.

¶8. (SBU) Experts from Afghanistan, the Republic of South Africa (RSA) and Singapore joined the ITWG for the first time and briefed the plenary on their experiences with nuclear forensics. The Afghani rep highlighted the lengthy uncontrolled border they have with their neighbor and requested the group's support in addressing illicit trafficking and forensics issues. The RSA rep noted that laboratory forensic specialists need to work closely with law enforcement to guide a graded response to illicit trafficking. A representative from the Democratic Republic of Congo was supposed to participate but was unable to attend the conference at the last minute.

¶9. (SBU) Juraj Vaclav from Slovakia's Nuclear Regulatory Authority briefed the ITWG on the November 2007 seizure of natural uranium (i.e., non-isotopically enriched). Police seized 481.4 grams of uranium oxide during a sting operation on the Hungary-Slovakia border. The material was reported to be smuggled from the Ukraine. A portable gamma detector allowed analysis in the field. The 98.65% confidence in the spectral measurement of  $^{235}\text{U}$  was incorrectly reported by a journalist as the isotopic enrichment of the sample. Subsequent analysis by alpha spectrometry was undertaken by a Slovakian university and confirmed that the uranium was not enriched. In March, 2008, 5.036 grams of the sample was transferred to the European Commission's Institute for Transuranium Elements (ITU) for comprehensive forensic analysis. The forensic data remains embargoed until the completion of the prosecution by the Slovakian authorities.

Institute for Transuranium Elements Analysis of Uranium Powders

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¶10. (SBU) M. Wallenius briefed the ITWG on an Institute of Transuranium Elements analysis of uranium powders to deduce their origin. Uranium has many molecular forms including oxides, fluorides, carbonates, and diuranates. There are many different ways to produce these powders. Uranium powder represents an intermediate product between uranium ore and nuclear fuel fabrication. There are no powder standards available. However, the powders are highly indicative of the processes used for their manufacture. Often the powder is a mixture of different inputs that complicate straightforward interpretation of origin. Several case studies have recently been completed or are underway at ITU on interdicted uranium powders. These analyses are important since they will contribute to a sample archive and a database on powdered uranium.

Thorianite Ore Trafficking in Brazil

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¶11. (SBU) Jorge Eduardo De Souza Sarkis from the Instituto de Pesquisas Energeticas e Nucleares briefed the ITWG on thorianite ore trafficking in Brazil. Thorianite is a mineral with high partition coefficients for thorium, uranium, lead, and rare earth elements (REEs) characterized by a high specific activity of up to 38, 000 kBq/kg. Thorianite, which is common in Brazil, can be found in beach sands and pegmatites. The price of the mineral has increased to \$300 dollars per kilogram due to the increasing demand for REE elements for high technology applications. As a result, thorianite ore trafficking is troublesome in Brazil and involves extensive smuggling of

the mineral. Police seized 520 kilograms of thorianite in February 2006 and are conducting further interdictions and arrests. To pursue prosecution of these smuggling cases and pursue criminal prosecutions requires reference materials for thorianite analysis. Presently it is difficult to state the origin of these materials based on absolute conce

ntrations of thorium, uranium, and lead. However, using ternary discrimination diagrams of U<sub>2</sub>O<sub>8</sub>, ThO<sub>2</sub>, PbO<sub>2</sub>, sourcing is possible when samples are plotted in comparison to other international sources of thorianite. Research continues into the use of lead isotopes and the REEs to discriminate different thorianite source geochemistry.

#### German RDD Response Exercise

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**¶12.** (SBU) M. Hoffman from the German Federal Office for Radiation Protection briefed the ITWG on a radiological dispersal device (RDD) response exercise. In the spring of 2008 Germany sponsored a major weapons of mass destruction emergency exercise entitled the Cologne Response Exercise; 16 internal German states participated throughout Germany. All 16 states can respond without the intervention of the federal government. The objective of the two-day exercise was defense against nuclear hazards. The exercise tested radiological detection, categorization of radiological materials, estimates of activity levels, medical deployment and decontamination. Additionally alarm protocols were evaluated, as was the deployment of local and federal responders for a variety of scenarios. The exercise commenced on June 2, 2008. The presence of a simulated dirty bomb (i.e., radiological dispersal device) was confirmed. On June 3, 2008 the simulated device was removed and transported to an examining laboratory. The exercise was complex to plan but extremely valuable. The after-action report determined that statewide emergency and consequence management communication was good. Because of the extensive preparation required for large-scale exercises, it may also be beneficial to do smaller exercises. Regular and credible liaison with the press and general public is essential in both exercises and actual events. A second national-level exercise for Germany is planned for November 2009.

**¶13.** (SBU) U.S. participants gave presentations on the U.S. technical nuclear forensics program and forensics cooperation. In addition, DOE funded the participation of Kyrgyzstani experts, and the DOS funded the participation of Afghanistan, Kazakhstani and Ukrainian experts.

#### Bilateral Discussions on Forensics Cooperation

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**¶14.** (SBU) In separate bilateral discussions with representatives from the IAEA, Russia, Germany, France and the UK on the margins of the ITWG, Curry previewed U.S. interest in holding a GI Plan of Work Activity on nuclear forensics this fall and our desire to enhance forensics cooperation by promoting the development of national nuclear material libraries. German, French and UK representatives were supportive. The IAEA representative believed the framework was well grounded but wanted to consult with Anita Nilsson before responding. The Russia representative agreed with the premise of national nuclear libraries but suggested using the G-8's CT group to develop the proposal further. Curry explained that the GI would provide a better forum because of our desire to include critical partners like the Central Asians.

#### U.S.-Russia Cooperation

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**¶15.** (SBU) Bilats with Rosatom -- Curry also discussed a proposal to enhance U.S.-Russian nuclear forensics cooperation with RosAtom. The RosAtom representative

reiterated the need to show his new leadership the legal foundation for this cooperation and suggested citing the Nuclear Terrorism Convention, the 1996 G8 summit statement on nuclear security and the MPC&A agreement. The RosAtom representative said that the MPC&A agreement has an explicit reference to bilateral cooperation on illicit trafficking and opined that forensics could be included if both sides agreed. The RosAtom representative said that bilateral forensics cooperation was discussed at the 9th JCC, and he suggested raising this issue again in this forum.

Side Meeting with IAEA on Technical Cooperation with ITWG

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¶16. (SBU) The ITWG Co-Chairs met with P. Colgan of the International Atomic Energy Agency (IAEA) after the plenary to discuss the future technical cooperation between the IAEA and ITWG. The IAEA indicated that closer collaboration between the two organizations was important to the Agency and the IAEA was willing to promote this partnership to best apply nuclear forensics to the counter-terrorism and nonproliferation interests of its member states. The Agency recognizes the substantive nuclear forensic technical expertise represented by ITWG. In the past, the IAEA has had difficulty formally recognizing the ITWG because of its lack of legal standing; due to the longevity of the ITWG, and its formulation of the Model Action Plan, it may be possible for experts in international law to review Agency products. The ITWG could be better integrated into the Agency's ongoing Cooperative Research Program in nuclear forensics. Potentially the IAEA might host a future ITWG annual meeting and have a representative serve on the ITWG Executive Committee. Anita Nilsson of the IAEA Office of Nuclear Security will be consulted about potential mechanisms for increased cooperation with the ITWG. A meeting of the ITWG Executive and other senior members with the IAEA to evaluate paths for increased cooperation was proposed for later in 2008.

Bulgarian Interest in Improving Forensic Capabilities

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¶17. (SBU) At the request of the Bulgarian National Security Service, and DNDO manager (S.Chase) and LLNL contractor (D.Smith) met with counter-proliferation staff, border police, and interior security representatives to discuss further development of nuclear forensic capabilities in Bulgaria. The Bulgarians were interested in training and access to field portable gamma detectors and generalized training in nuclear incident border response. These law enforcement officials desire practical information on nuclear categorization and characterization more specific than that described in their national response plan. USG program staff informed the Bulgarians that a government-to-government agreement was required to initiate USG assistance and that an operational USG entity like the FBI or Customs Border Protection was required to conduct training of this type. The initial request from the Bulgarians for USG assistance should be made through U.S. Embassy Sofia. The Bulgarians stated they had just entered into an agreement with the National Nuclear Security Administration's Second Line Defense as part of an emerging comprehensive program in nuclear border security.

Tajikistan Request for Assistance with Yellowcake and Tailings

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¶18. (SBU) In a side discussion, a DOE/NNSA representative received a request from Dr. Muzafar Yunusov of State Enterprise Vostokredmet in Tajikistan to find a buyer for

about 10,000 kgs of U308, currently in locked storage at Vostokredmet. To date, Dr. Yunusov says he has approached Kazakhstan, Kyrgyzstan and France to locate a buyer, but to no avail. Secondly, he described a very large field of uranium tailings at the Digma site, which he would also like assistance in stabilizing and securing. By his calculation, these tailings are the equivalent of 2,500 tons of yellow cake, which he believes could also be sold. He has previously approached LLNL with this request for assistance to locate a buyer for the U308 and has documented the inventory of ore concentrate. DOE/NNSA did not promise assistance, but agreed to circulate the request.

**¶19. (U) ITWG participants:**

AFGHANISTAN: Afzal Ahmadi and Dr. Abdul Malik (Ministry of Public Health)

AUSTRALIA: Michael Colella (Australian Nuclear Science & Technology Organization) and David Hill (ANSTO);

AZERBAIJAN: Dinara Abbasova and Ibrahim Gabulov (Institute of Radiation Problems)

BRAZIL: Jorge Eduardo De Souza Sarkis (Institute de Pesquisas Energeticas e Nucleares -- IPEN) and Marcos R.L. do Nascimento (Comissao Nacional des Energia Nuclear -- CNEN)

BULGARIA: Angel Angelov (Ministry of Inferior Affairs), Tzveta Apostolova (Institute for Nuclear Research and Nuclear Energy), Emil Bonev (Nuclear Regulatory Agency), Nina Nikolova (Institute for Nuclear Research and Nuclear Energy), Rumen Christov (Border Police Directorate), Spas Stoyanov (NSS), Aleksandar Strezov (Institute for Nuclear Research and Nuclear Energy) and Boris Tsenov (NSS)

CANADA: Carey Larsson (Defence Research and Development Canada)

CZECH REPUBLIC: Jan Lengyel (Nuclear Research Institute (Central Analytical Laboratory)

EC: Klaus Mayer (European Commission-Joint Research Center) and Maria Wallenius (Institute for Transuranium Elements)

EUROPOL: Jose Garcia Sainz

FINLAND: Paula Karhu (STUK) and Antero Kuusi

FRANCE: Stephane Baude (Commissariat a l'Energie Atomique) and Jean-Charles Hubinois (CEA Valduc)

GEORGIA: Grigol Kiknadze (Institute of Physics)

GERMANY: Michael Hoffmann (German Federal Office for Radiation Protection), Emily Kroger (German Federal Office for Radiation Protection), Peter Milpert (AMT fur Militarkunde) and Roland Grasegger (AMT fur Militarkunde)

HUNGARY: Gabriella Racz, and Stefanka Zsolt (Institute of Isotopes)

IAEA: Peter Colgan

ISRAEL: Uri Adman (IAEC-NRCN)

KAZAKHSTAN: Seiylkhan Kabayev (KazahAtomProm)

LITHUANIA: Laima Pilkyte (Radiation Protection Centre)

NETHERLANDS: Jan Dalmolen, and Rabinderpersad Gajadhar (Netherlands Forensic Institute)

RUSSIA: Victor Erastov (Federal Atomic Energy Agency (ROSATOM), Ekaterina Kuteynikova (Bochvar Research

Institute of Inorganic Materials-- VNIINM)

SERBIA: Dragana Nikolic (The 'Vinca' Institute of Nuclear Sciences)

SINGAPORE: Sng Mui Tang

SLOVAKIA: Pavol Admek (Institute of Public Health) and Juraj Vclav (Nuclear Regulatory Authority of the Slovak Republic)

SOUTH AFRICA: Arnaud Faanhof (NECSA)

SWEDEN: Vitaly Fedchenko (Stockholm International Peace Research Institute) and Olof Karlberg

TAJIKISTAN: Muzafer Yunusov (Sl "Vostokredmet")

UKRAINE: Aleksandr Krasheninniku (Ukrainian Security Service)

UNITED KINGDOM: Paul Thompson (AWE)

UNITED STATES: Christina Andersson (DOE), Jim Blankenship (FBI), Steve Chase (DHS), Eugene Cheney (DOD), Michael Curry (STATE), Rich Hanlen (PNNL), Greg Haugan (DHS), Mike Kristo (LLNL), Jeff Leggitt (FBI), Mark Porter (Civilian R&D Foundation), David Smith (LLNL), and John Wacker (DOE), RICE

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